

**DEVICE FOR APPLYING A FLUID OR GEL SHAVING PRODUCT**

*Field of the Invention*

The objective of the present invention is to provide a device for applying a product suitable for shaving, in particular a product in the form of a gel, foam or cream, and more particularly its objective is an application device including an application head with short bristles.

*Background of the Invention*

Traditionally, to facilitate shaving, a shaving brush has been used to wet and soften the hair to be shaved with a mixture of soap and water, which was foamed by mechanical agitation of the shaving brush. The water/soap mixture acts on the principal constituent of hair, keratin, which passes from form alpha (helical) to form beta (sinusoidal) through rupture of the hydrogen bonds. This structural change makes the hair easier to cut and therefore makes shaving more effective.

The capacity to form foam is referred to in the present Application by the expression "foaming effect".

In the course of time new products to assist shaving have been developed which dispense with the need for soap/water mixtures to be foamed with a shaving brush. These products include shaving creams, foams and gels, sometimes in the form of aerosols, which are applied manually to the skin and which foam by a simple rubbing of the skin with the hand, or even by simple contact with the air. Non-foaming gels also exist which form a film on the skin having the same function as foam, i.e. embrittlement of the hair structure to facilitate cutting.

Devices with reservoirs allowing the shaving product to be applied without direct contact between the product and the user's hand have also been developed. These devices are intended to be rubbed on the skin by the user in order to obtain a shaving foam originating from the suitable product contained in the reservoir.

Thus, document FR 2 087 992 describes very succinctly a shaving brush with long bristles the handle of which serves as a reservoir for the shaving cream.

Other prior documents describe devices with reservoirs, but they are addressed principally to the problem of supplying the application head with product

contained in the reservoir. Reference can be made, for example, to documents EP 0 142 651, FR 2 571 230, FR 2 582 921, DE 90 15 155, WO 97/08970.

These documents refer to a shaving brush or to bristles. They limit themselves in most cases to simply stating the presence of bristles or the presence of  
5 an end portion in the form of a shaving brush, and the drawings all show devices with bristles which are long or even very long in relation to the rest of the device, thus reproducing with respect to the application head of the device the appearance and structure of a conventional shaving brush. This is consistent with the objective sought, namely an effective foaming effect. Indeed, conventional shaving brushes  
10 are known for their ability to provide such a foaming effect. It therefore seemed logical that the application zone of these various devices should not have been modified with respect to conventional shaving brushes, and that long bristles organized in a tuft had been retained in order to retain the foaming effect of the shaving brush. The term "bristle" [French: "soie"] itself, used in certain documents,  
15 also recalls the notion of the conventional shaving brush because this term refers to the long coarse bristles of swine (for example, wild boar) used in the traditional manufacture of shaving brushes.

However, prior document FR 2 588 460, which describes an improved shaving brush including a reservoir, gives details regarding the characteristics of the  
20 bristles, or more precisely, regarding one of these characteristics, namely their length. It states that the length of the bristles has a direct impact on the formation of foam, and that long bristles should be used. Long bristles are defined as having a length greater than 2.5 cm, the document adding that bristles longer than 2 cm can have a foaming effect 30% superior to that achieved with bristles of 2 cm.

25 The general teaching of these various documents is, therefore, that it is possible to combine a reservoir for shaving product with a conventional shaving brush, but that it is essential to use the bristles found in conventional shaving brushes, that is to say, long bristles, in order to obtain the foaming effect sought. It is even recommended that the length of the bristles be increased in order to increase  
30 the efficiency of shaving.

However, the Applicant has found that such devices with long bristles are far from being satisfactory.

First of all, their aesthetic appearance is extremely poor when wet because of the lack of shape and rigidity of the wet bristles, this lack of shape sometimes persisting even after drying. Both the length of the bristles and their lack of rigidity and shape in the wet state can also lead to difficulty in the replacing a lid or cap on the device after use.

Equally and above all, however, the Applicant has discovered that, contrary to the teaching of the prior art, the use of short bristles on these devices enables a remarkable foaming effect to be achieved while obtaining very clear advantages for the user.

### *Summary of the Invention*

The objective of the invention is therefore to provide a device for applying a fluid or a gel shaving product comprising:

- a body including a reservoir for said product,
- an application head comprising bristles fixed on a support having at least one orifice, said head being adaptable to said body,
- means for conveying the product from the reservoir to the application head,

this device being characterized in that the length of the bristles is less than 20 mm, preferably less than 15 mm, and more preferably still not more than 10 mm. Preferably the length is not less than 5 mm.

The bristles used in the device according to the invention can be of synthetic material, for example polyester, polyamide or acrylic resin, or of natural material, for example wild boar or pig bristle, sheep's wool, camel hair or mohair, the material being pure or mixed. In a preferred embodiment, especially with a view to achieving an agreeable contact with the skin, the bristles are natural bristles, preferably of mohair.

The diameter of the bristles can be variable. For example, bristles with a diameter between approximately 15  $\mu\text{m}$  and approximately 60  $\mu\text{m}$ , preferably between approximately 20  $\mu\text{m}$  and approximately 40  $\mu\text{m}$ , and more preferably still between approximately 35  $\mu\text{m}$  and approximately 40  $\mu\text{m}$  can be used. When the

bristles used are of mohair, their diameter can be between approximately 15  $\mu\text{m}$  and approximately 40  $\mu\text{m}$ , preferably between approximately 30  $\mu\text{m}$  and approximately 40  $\mu\text{m}$ , and still more preferably between approximately 35  $\mu\text{m}$  and approximately 40  $\mu\text{m}$ .

5 In a preferred embodiment the support on which the bristles are fixed is a surface of low thickness called the backing. In the present Application the term "carpet" refers to the ensemble of bristles and backing.

The thickness of the backing is preferably less than 1 mm, for example of the order of 0.5 mm. The backing is made of a material adapted to be at the same time  
10 rigid and elastically deformable. It may be made, for example, of polyester or of polyester reinforced with an elastomer.

*Sub B1* In one embodiment it may be formed by a network of polyester threads resulting from an association of warp and weft threads. The density of the backing, and therefore its properties of rigidity and deformation, then depend on the number  
15 of warp threads and the number of weft threads per centimeter, these parameters being easily determined by a person skilled in the art.

The number of weft threads can be between approximately 25/cm and approximately 50/cm, preferably between approximately 30/cm and approximately 40/cm, and more preferably still from 35/cm to 38/cm. The number of warp threads  
20 can be between approximately 15/cm and approximately 40/cm, preferably between approximately 20/cm and approximately 30/cm, and more preferably still from 22/cm to 24/cm.

When the support is a backing, the orifice present in said backing and allowing the product to pass towards the bristles is preferably a slit. In certain  
25 embodiments there may be a plurality of slits, arranged in different ways with respect to each other, for example forming a cross or parallel to each other. The number, size and position of the slits depend on the size and section of the backing (circular or elliptical section, for example), which themselves depend on the size and section of the body used. These parameters can be easily determined by a person  
30 skilled in the art. For a backing 4 cm in diameter, for example, three parallel slits enable an efficient result to be obtained. The direction and cut of the slit(s) are

entirely independent of the position of the bristles on the backing, and of the position of the polyester threads in the case of a network.

Because of its structure, such a backing has special properties of rigidity and elastic deformation. Indeed, the backing deforms only under the pressure of the product (mechanical pressure, propellant, etc.) causing an opening of the slit(s), which return(s) to its/their starting position when the pressure ceases. This enables sufficient fluid-tightness of the device to be obtained. This fluid-tightness is particularly useful in the envisaged application for shaving products, because such an application generally implies contact of the device with water, and even sometimes washing under running water. The backing used in accordance with the invention allows the entry of water into the body and reservoir, and therefore contamination of the product contained in the reservoir, to be avoided.

The bristles are fixed by any appropriate means, for example by weaving, bonding, flocking or ultrasound, to at least a portion of the surface of the backing, preferably the whole surface, so that they are substantially parallel to each other. In this way a structure resembling that of a carpet is formed.

The appropriate density for the bristles on the support, in particular on the backing, depends especially on the bristles used and in particular on their type and diameter. It has been found that this density should be between approximately 30 bristles/cm<sup>2</sup> and approximately 500 bristles/cm<sup>2</sup>, preferably between approximately 50 bristles/cm<sup>2</sup> and approximately 200 bristles/cm<sup>2</sup>, and more preferably still between approximately 90 bristles/cm<sup>2</sup> and approximately 110 bristles/cm<sup>2</sup>.

In a preferred embodiment the bristles, preferably fixed on a backing to form a carpet, are fixed on a base which can be fitted to the body of the application device. The form of the base is chosen to facilitate the fitting of the carpet to the body. More precisely, this base has a central surface receiving the bristles or the backing, and a portion permitting fitting to the body through screwing or snap-fitting, for example. The cross-section and size of the base depend on those of the body or application device to which it is fitted.

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5 The bristles or the backing are fixed to at least a portion of the central surface of the base, preferably the whole central surface, by any appropriate means, for example by bonding or heat fusing, the bristles projecting beyond the height of the base by at least a few millimeters. In such an embodiment, the length of the bristles defined in the present Application, less than 20 mm and preferably not less than 5 mm, corresponds to the length of the bristles projecting beyond the base.

10 Of course, the base must include at least one orifice allowing the product to pass from the reservoir to the slit(s) of the backing. In one embodiment it has a single orifice of large size passing through its center. It can also have one or more orifices forming a cross.

15 The shape and the constitutive material of the base are selected both to facilitate fitting of the head to the body and to make contact between the application device and the user's skin more agreeable. The cross-section and the size of the base depend on those of the application device to which it is fitted. Its thickness is preferably a few millimeters. The base can be made of any rigid material which is agreeable when in contact with the skin, for example, plastic or polyethylene or sintered polyethylene. In a preferred embodiment the outside edge of the base is rounded to make contact with the skin still more pleasant.

20 Such a base allows the general appearance of the device and the contact with the skin to be improved and protects the bristles located at the outer edge of the backing, especially when fitting a lid or plug, and facilitates fitting of the head to the body to form the application device.

25 The application head as described above is therefore adaptable to a body in order to form an application device for a fluid or gel shaving product. Each of the different elements constituting the device (reservoir, body, backing, support, etc.) is provided with at least one orifice allowing the product to pass from the reservoir to the application head. This head can itself be covered by a lid or plug.

30 In accordance with the present Application, "liquid or gel product" is understood to mean any appropriate shaving product, for example a foaming aerosol gel, a foaming non-aerosol gel, a non-foaming gel, or a foaming cream. Foaming products form a foam once applied because of the dissolved gas (aerosol), or the

presence of surface-active agents (non-aerosol), and/or the mechanical action of the user (directly or via an application device). In particular, non-aerosol gels called "post-foaming" gels exist which emerge from their reservoir in the form of a gel and, owing to their isopentane content, foam as a result of the mechanical action of the user and of the temperature of the skin. Non-foaming products are spread mechanically (manually by the user or via an application device) to form a film whose action on the hair is similar to that of foam, i.e. modifying the structure of the hair to facilitate cutting. The foaming effect with which the present invention is concerned also includes the ability to form a film from a non-foaming shaving product, said film having the same function as foam.

Shaving product application devices, and therefore the bodies of these devices, can vary according to the type of product to be applied. They can include any type of known device, for example an aerosol can, a tube or a stick, of a size appropriate to the desired use (for example, device for travel or for family use).

The head can be fitted to the body by any known means, for example screwing or snap-fitting, by the intermediary of the support or the backing or the base. Several different heads can be fitted successively to the same body.

*Sub B3* In some embodiments, the body is integrated with the shaving product reservoir, and the walls of the body are also those of the reservoir. This can be the case for a stick, for example, or for an aerosol can, i.e. a can containing a shaving product mixed with a gas propellant. In other embodiments the reservoir is enclosed by the body. This is the case in particular for a non-aerosol can, i.e. a can comprising a reservoir or bag containing the product surrounded by a propellant gas located in the space between the body and the reservoir, the propellant thus not being in contact with the product.

In some embodiments the head and the reservoir are made in one piece, that is, in a monobloc structure (by injection molding, for example). This can be the case in particular for sticks. In other embodiments the head can be fitted directly to the body. Finally, in other embodiments it can be fitted to a complete known application device, being placed, for example, on an aerosol or non-aerosol can provided with an application head (generally including a valve) or on a monobloc stick. The resulting

application device then includes two heads: the existing head and the head including bristles according to the invention.

The application head can be disposed in the longitudinal axis of the body (see Fig. 1), or can be inclined with respect to this axis (see Fig. 2).

5 The means for conveying the product from the reservoir to the head can comprise any known means used to distribute cosmetic or shaving products. It may comprise, for example, an endless screw actuating a piston, a pusher or piston sliding under pressure, a propellant gas mixed with the product (aerosol gel) or a propellant gas separate from the product (non-aerosol gel), manual pressure (in the  
10 case of a deformable body or reservoir such as a flexible tube). The coupling of a means of conveyance to a metering means, in order to apply a controllable quantity of product, can also be envisaged.

A particularly preferred embodiment of the device according to the invention comprises an application head including a carpet fixed to a non-aerosol can  
15 including a post-foaming gel in a flexible, deformable bag surrounded by a propellant which is preferably compressed air. Compressed air is preferred to other propellants such as butane or propane for ecological reasons.

*Subst* Also preferably, the application head (4) is fixed to the valve (10) of the non-aerosol can, which can be ring-shaped in structure, i.e. open at the center. The user  
20 slides a single finger into the ring and presses on the valve (10), causing gel to be emitted. Thus, emission of the product is obtained by pressing a single finger. Other forms of valve allow the product to be emitted by pressure from one or two fingers.

In the case of a can, whether aerosol or non-aerosol, pressure by the user on the valve of the can, no matter in what way, causes the product to be emitted through  
25 the application head and therefore permits its application to the skin. Depending on the device, the pressure can be applied in the longitudinal axis of the product or obliquely with respect to this axis, at the center or on one side with respect to this axis.

The device according to the invention therefore allows a remarkable foaming  
30 effect to be obtained while avoiding any contact between the user (outside the shaving zone, of course) and the product.

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## *Brief Description of the Drawings*

The invention will be explained in more detail with reference to the drawings, in which:

- Fig. 1 shows schematically, in longitudinal section, one embodiment of a device according to the invention;
- 5 - Fig. 2 shows another embodiment of the invention,
- Figs. 3a, 3b and 3c show several backings usable in devices according to the invention, in cross section,
- Fig. 4 shows schematically, in longitudinal section, an embodiment of the application head of a device according to the invention including a base with a rounded outside edge,
- 10 - Fig. 5a shows schematically in section an application device according to the invention including a non-aerosol can fitted with a valve and an application head, Figs. 5b to 5e representing schematically other forms of valve.

15 *Sub 6b* *Detailed Description of the Preferred Embodiments*  
Fig. 1 represents schematically, in longitudinal section, an embodiment of an application device (1) according to the invention comprising a body (2) including a reservoir (3) for the product suitable for shaving, an application head (4) comprising short bristles (5) fixed on a support (7), said head being adaptable to said body, and means (6) for conveying product from the reservoir to the application head. In this  
20 example the means of conveyance (6) is a piston (6c) controlled by an endless screw (6a) rotated by the intermediary of the base (6b) of the body. The support (7) is a backing, and is fixed to a base (9) provided with an orifice allowing product to pass to the outside.

25 Figs. 2 shows schematically an aerosol can (2) on which is fitted an application head (4) comprising short bristles (5) fixed to a backing (7) itself fixed to a base (9).

Figs. 3a, 3b and 3c show different backings (7) perforated by slits (8).

30 Figs. 4 shows schematically, in longitudinal section, an embodiment of the application head (4) of a device according to the present invention comprising a base (9) with a rounded external edge, on which is fixed the backing (7) carrying the short bristles (5).

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Sub 57 Fig. 5a shows a non-aerosol can (2) comprising a post-foaming gel and an application head (4) forming an application device (1) according to the invention. The can (2) includes a flexible and deformable internal bag (3) containing the gel and surrounded by gas propellant, preferably compressed air. The application head (4), which here is circular, is fixed on the valve (10) of the non-aerosol can, which valve is annular in form, i.e. open at the center. The user can slide one finger into the ring and press on valve (10) with only one finger (represented by an arrow), causing gel to be emitted and to pass through the application head to be applied by the user and foamed.

10 Figs. 5b to 5e show different application heads fixed to different valves (10), the arrows representing pressure applied by the user with one or two fingers.

The tests described below show that the device according to the invention allows an efficient foaming effect to be obtained, permits easy and pleasant use for the consumer, in particular because the bristles retain their structure even after several successive cycles of wetting and drying. In addition, cleaning under running water is also facilitated as compared to devices according to the prior art with long bristles.

**TEST**

20 Several application devices as described in Fig. 1 were tested by a panel of 10 persons.

The shaving gel used has the following composition:

	Myristic acid.....	8%
	Lauric acid.....	4%
25	Deionized water.....	to 100
	Sodium N-lauryl sarcosinate.....	10%
	Glycerin.....	2%
	PEG-150 pentaerythritol tetrastearate.....	2%
	Aloe Vera gel.....	1%
30	PEG-7 glyceryl cocoate.....	2%
	Hydroxyethyl cellulose.....	1%

Potassium hydroxide 50%..... QS  
Perfume, colorant, preservative..... QS.

5 The support is a backing formed by a network of polyester threads, comprising 24 warp threads per <sup>centimeter</sup> ~~centime~~ and 37 weft threads per centimeter. The density of bristles on the backing is approximately 104 bristles/cm<sup>2</sup>.

Several types of device were tested, the type and length of the bristles being varied.

10 The following characteristics were evaluated for each device tested:

- efficacy of foaming effect,
- ease of cleaning with water after use,
- appearance after use,
- agreeable contact with the skin.

15 In the first stage bristles of different types and with lengths varying between 3 mm and 30 mm were tested. The results are given in Table I below. Each result represents the "average" of the responses of 10 persons. These are qualitative results:

(+) = good

(-) = poor

(±) = average.

20

TABLE I

BRISTLES TESTED	CHARACTERISTICS			
	Foaming effect	Cleaning	Appearance after use	Contact
Mohair 3 mm	-	+	+	+
15 mm	+	+	+	+
30 mm	+	-	-	+
Acrylic 3	-	+	+	-
15	+	+	+	±
30	+	-	±	±
Wool 3	-	+	+	+
15	+	+	±	+
30	+	-	-	+
Wild boar 3	-	+	+	-
15	+	+	+	±
30	+	-	-	±

5 These tests demonstrated that excessively short bristles (3 mm) do not allow the essential foaming effect to be obtained, while lengths of 30 mm do not allow the desired ease of cleaning, appearance after use and agreeable contact to be achieved.

It can also be noted that mohair is particularly advantageous among the types of bristles tested.

10 A second series of tests was then undertaken in which a series of lengths between approximately 5 mm and 20 mm, with mohair or acrylic bristles were tested. The results are given in Table II.

TABLE II

BRISTLES TESTED	CHARACTERISTICS			
	Foaming effect	Cleaning	Appearance after use	Contact
Mohair 5 mm	±	+	+	+
7 mm	+	+	+	+
10 mm	+	+	+	+
15 mm	+	+	+	+
20 mm	+	±	-	+
25 mm	+	-	-	+
Acrylic 5	±	+	+	±
7	+	+	+	±
10	+	+	+	±
15	+	+	±	±
20	+	±	-	±
25	+	-	-	±

5 It can be noted that mohair is generally preferred because of its particularly pleasant contact.

Above a length of 20 mm the bristles no longer permit the desired qualities of appearance and ease of cleaning to be obtained. It is noted that the most efficacious lengths are those not less than 5 mm and less than 20 mm, preferably less than 15 mm, and more preferably still not more than 10 mm.

10 These tests enabled the preferred length of bristles to be selected in order to obtain the best compromise between the efficacy of the foaming effect obtained, preservation of good bristle shape over wetting/drying cycles combined with rigidity of bristles, and suppleness of bristles in order to obtain a pleasant contact with the user's skin.